

EL 844051802

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

**PRIORITY** Application Serial No. .... 09/115,339

**PRIORITY** Filing Date ..... July 14, 1998

Inventor ..... Werner Juengling et al.

Assignee ..... Micron Technology, Inc.

**PRIORITY** Group Art Unit ..... 2813

**PRIORITY** Examiner ..... E. Kielin

Attorney's Docket No. .... MI22-1789

Title: Methods of Forming Materials Between Conductive Electrical  
Components, and Insulating Materials

**PRELIMINARY AMENDMENT**

To: Box PATENT APPLICATION  
Assistant Commissioner for Patents  
Washington, D.C. 20231

From: Bernard Berman (Tel. 509-624-4276; Fax 509-838-3424)  
Wells, St. John, Roberts, Gregory & Matkin P.S.  
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Sir:

This is a preliminary amendment accompanying a Request for  
Continuation Application for the above-entitled patent application. Prior to  
examining the application, please enter the following amendments.

FOI b7 - 4292660

## AMENDMENTS

### In the Specification

At p. 1, before the "Technical Field" section, insert,

--RELATED PATENT DATA

This patent resulted from a continuation application of U.S. Patent Application Serial Number 09/115,335 filed on July 14, 1998 which is a divisional application of U.S. Patent Application Serial Number 08/947,847 filed on October 9, 1997.--.

At p. 38, replace the abstract with,

-- ABSTRACT OF THE DISCLOSURE

Methods of forming insulating materials between conductive elements include forming a material adjacent a conductive electrical component comprising: partially vaporizing a mass to form a matrix adjacent the conductive electrical component, the matrix having at least one void within it. Other methods include forming a material between a pair of conductive electrical components comprising: forming a pair of conductive electrical components within a mass and separated by an expanse of the mass; forming at least one support member within the expanse of the mass, the support member not comprising a conductive interconnect; and vaporizing the expanse of the mass to a degree effective to form at least one void between the support member and each of the pair of conductive electrical components. Some embodiments

include an insulating material adjacent a conductive electrical component, such material comprising a matrix and at least one void within the matrix.-

### **CLAIMS**

Please cancel Claims 1-96 without prejudice.

97. A method of forming a material adjacent a conductive electrical component comprising:

- providing the conductive electrical component over a substrate;
- spinning a liquid onto the substrate and adjacent the conductive electrical component;
- at least partially curing the liquid into a substantially self-supporting mass comprising carbon and silicon;
- forming a layer overlying the mass; and
- partially vaporizing the mass.

98. The method of Claim 97, where the mass, after at least partially curing the liquid and under a selected condition, comprises a substantially non-vaporizable portion and a substantially vaporizable portion

99. The method of Claim 98, where the vaporizable portion of the mass comprises a solvent and wherein the solvent is removed from the mass as the mass is at least partially vaporized.

100. The method of Claim 97, where the liquid comprises two solvents as the liquid is spun onto the substrate, one of the solvents being more volatile than the other, the more volatile solvent being substantially removed by evaporation during the at least partially curing and the other solvent substantially remaining, the other solvent being substantially removed from the mass as the mass is at least partially vaporized, the removing of the other solvent providing the forming of at least one void.

101. The method of Claim 100, where the mass is substantially totally vaporized.

102. The method of Claim 97, where the forming of the layer over the mass comprises forming the layer before at least partially vaporizing the mass.

103. The method of Claim 97, where the forming of the layer over the mass comprises forming the layer after at least partially vaporizing the mass.

104. The method of Claim 97, where the self-supporting mass comprising carbon and silicon, encompasses a material consisting of a silicon and carbon containing molecule.

105. A method of forming a material adjacent a conductive electrical component comprising:

providing a mass adjacent the conductive electrical component, the mass comprising pores having a size and the mass comprising molecules consisting of silicon and carbon;

forming a layer overlying the mass; and

vaporizing a portion of the mass wherein the vaporizing expands the size of the pores within the mass.

106. The method of Claim 105, where the pores are expanded by vaporizing a portion of the mass.

107. The method of Claim 105, where the molecules comprise a ratio of silicon to carbon from about 5:1 to about 1:3.

108. The method of Claim 105, where providing the mass comprises spinning a liquid onto the substrate and adjacent the conductive electrical component and at least partially curing the liquid, the liquid comprising at least a first material and a second material.

109. The method of Claim 108, where the first material comprises a first solvent and the second material comprises a second solvent, the first solvent having a high vapor pressure than the second solvent.

110. The method of Claim 108, further comprising partially curing the liquid where the first material is essentially completely vaporized by the partially curing.

111. The method of Claim 105, further comprising forming a layer over the mass before the partially vaporizing.

112. The method of Claim 105, further comprising forming a layer over the mass after partially vaporizing.

113. The method of Claim 107, where the conductive material component comprises a pair of conductive lines.

114. The method of Claim 113, further comprising forming at least one support member between the pair of conductive lines.

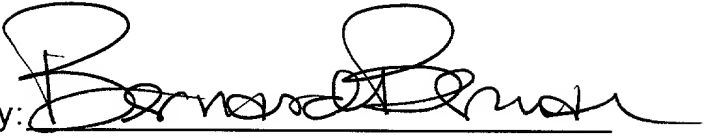
## REMARKS

This Preliminary Amendment is submitted concurrently with a filing of a Continuation Application of Serial No. 09/400,127, which in turn is a Divisional Application of Serial No. 08/947,847 (hereinafter the '847 application). The originally filed '847 application is provided.

Claims 97-114 presented herein, do not add new matter and are fully supported by the specification and drawings. Specifically, each of the newly submitted claims recites, in pertinent part, a mass or matrix (and/or a precursor of such mass or matrix) that comprises carbon and silicon. Support for this recital is found at page 7, among other places, of the original specification. Therefore, Applicant respectfully requests examination of the instant application including the claims added herein.

Respectfully submitted,

Dated: Oct 12, 2001

By:   
Bernard Berman  
Reg. No. 37,279

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Attorney's Docket No. .... MI22-1789

Title: Methods of Forming Materials Between Conductive Electrical Components, and Insulating Materials

**VERSION WITH MARKINGS TO SHOW CHANGES MADE  
ACCOMPANYING PRELIMINARY AMENDMENT**

The abstract has been amended as follows. Underlines indicate insertions and ~~strikeouts~~ indicate deletions.

~~The invention encompasses~~ Methods of forming insulating materials between conductive elements. ~~In one aspect, the invention includes a method of forming a material adjacent a conductive electrical component comprising: a) partially vaporizing a mass to form a matrix adjacent the conductive electrical component, the matrix having at least one void within it. In another aspect, the invention~~ Other methods includes a ~~method of forming a material between a pair of conductive electrical components comprising the following steps: a) forming a pair of conductive electrical components within a mass and separated by an expanse of the mass; b) forming at least one support member within the expanse of the mass, the support member not comprising a conductive interconnect; and e) vaporizing the expanse of the mass to a degree effective to form at least one void between the support member and each~~

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of the pair of conductive electrical components. ~~In another aspect, the invention~~ Some embodiments includes an insulating material adjacent a conductive electrical component, ~~the insulating~~ such material comprising a matrix and at least one void within the matrix. ~~In another aspect, the invention includes an insulating region between a pair of conductive electrical components comprising: a) a support member between the conductive electrical components, the support member not comprising a conductive interconnect.; and b) at least one void between the support member and each of the pair of conductive electrical components.~~